

Journal of Catalysis

EDITORS:

W. Keith Hall

Frank S. Stone

EDITORIAL BOARD:

R. B. Anderson

H. Knözinger

M. Boudart

J. H. Lunsford

J. B. Butt

A. Nielsen

A. Cimino

J. F. Roth

B. Delmon

W. M. H. Sachtler

R. P. Eischens

P. W. Selwood

P. C. Gravelle

G. V. Smith

J. Haber

K. Tamari

C. Kemball

S. J. Thomson

G. W. Keulks

P. B. Weisz

Volume 61 • 1980



ACADEMIC PRESS

A Subsidiary of Harcourt Brace Jovanovich, Publishers

New York London Toronto Sydney San Francisco

Copyright © 1980 by Academic Press, Inc.

All Rights Reserved

No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the copyright owner.

The appearance of the code at the bottom of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use, or for the personal or internal use of specific clients. This consent is given on the condition, however, that the copier pay the stated, per copy fee through the Copyright Clearance Center, Inc. (Operations Staff, P.O. Box 765, Schenectady, New York 12301), for copying beyond that permitted by Sections 107 or 108 of the U.S. Copyright Law. This consent does not extend to other kinds of copying, such as copying for general distribution, for creating new collective works, or for resale. Copy fees for pre-1980 articles are the same as those shown for current articles.

MADE IN THE UNITED STATES OF AMERICA

Contents of Volume 61

Number 1, January 1980

H. DAVIDOVÁ AND M. KRAUS. Isomerization of Hydrogenolysis of 1,2-Epoxybutane on Platinum	1
KAORU FUJIMOTO, MASATAKA KAMEYAMA, AND TAISEKI KUNUGI. Hydrogenation of Adsorbed Carbon Monoxide on Supported Platinum Group Metals.....	7
ROY W. CLARK, JOHN K. TIEN, AND PAUL WYNBLATT. Loss of Palladium from Model Platinum-Palladium Supported Catalysts during Annealing	15
J. SCHWANK, G. PARRAVANO, AND H. L. GRUBER. An Infrared Study of CO Adsorption on Magnesia-Supported Ruthenium, Gold, and Bimetallic Ruthenium-Gold Clusters	19
JONG RACK SOHN AND ATSUMU OZAKI. Acidity of Nickel Silicate and Its Bearing on the Catalytic Activity for Ethylene Dimerization and Butene Isomerization ...	29
LEE A. PEDERSEN AND JACK H. LUNSFORD. A Study of Ruthenium in Zeolite-Y by X-Ray Photoelectron Spectroscopy	39
DAVID H. S. YING AND ROBERT J. MADIX. Thermal Desorption Study of Formic Acid Decomposition on a Clean Cu(110) Surface	48
R. L. MOSS, D. POPE, AND B. J. DAVIS. The Structure and Activity of Supported Metal Catalysts. IX. Preparation, Dispersion, and Activity of Palladium-Silver on Silica Catalysts	57
J. M. DALE, L. D. HULETT, E. L. FULLER, H. L. RICHARDS, AND R. L. SHERMAN. High-Temperature Effects on a Co-Mo-Al ₂ O ₃ Catalyst.....	66
DAVID L. KING. An <i>in Situ</i> Infrared Study of CO Hydrogenation over Silica and Alumina-Supported Ruthenium and Silica-Supported Iron	77
R. M. KROEKER, W. C. KASKA, AND P. K. HANSMA. Formation of Hydrocarbons from Carbon Monoxide on Rhodium/Alumina Model Catalysts	87
GEORGE A. OLAH, DAVID MEIDAR, RIPUDAMAN MALHOTRA, JUDITH A. OLAH, AND SUBHASH C. NARANG. Heterogeneous Catalysis by Solid Superacids. 14. Perfluorinated Resinsulfonic Acid (Nafion-H)-Catalyzed Freidel-Crafts Alkylation of Toluene and Phenol with Alkyl Chloroformates and Oxalates.....	96
WOJCIECH GRABOWSKI, MAKOTO MISONO, AND YUKIO YONEDA. Quantum Chemical Study of Acid-Base Properties of Metal Oxides. I.....	103
ELIAHU LICHT, YEHOOSHUA SCHÄCHTER, AND HERMAN PINES. Reactions of Primary and Secondary Alkanols over Platinum-, Iridium-, and Rhodium-Silica (Cab-O-Sil) Catalysts in the Presence of Hydrogen: Variables Affecting Ether Formation.....	109
P. GENESTE, P. AMBLARD, M. BONNET, AND P. GRAFFIN. Hydrodesulfurization of Oxidized Sulfur Compounds in Benzothiophene, Methylbenzothiophene, and Dibenzothiophene Series over CoO-MoO ₃ -Al ₂ O ₃ Catalyst.....	115
H. KWART, G. C. A. SCHUIT, AND B. C. GATES. Hydrodesulfurization of Thiophenic Compounds: The Reaction Mechanism.....	128
TOSHIO OKUHARA AND KEN-ICHI TANAKA. Intermediates of Hydrogenation of Conjugated Dienes and of the Isomerization of <i>n</i> -Butenes on CdO Catalyst..	135
K. FOGER AND J. R. ANDERSON. Skeletal Reactions of Neopentane over supported Platinum-Gold Catalysts	140
R. BOUWMAN AND L. H. TONEMAN. An Auger Spectroscopic Study of Radial Concentration Profiles in Spent Co, Mo/γ-Al ₂ O ₃ Hydrodesulfurization Catalysts	146
WARREN W. KAEDING AND STEPHEN A. BUTTER. Production of Chemicals from Methanol. I. Low Molecular Weight Olefins	155
K. V. UMA AND S. M. MAYANNA. Kinetics and Mechanism of Oxidation of Primary Alcohols by Chloramine-T Catalyzed by OsO ₄	165
ALEXANDER C. CIRILLO, JR., J. M. DEREPPÉ, AND W. KEITH HALL. Studies of the Hydrogen Held by Solids. XXV. The Proton Resonance from H ₂ Adsorbed on Alumina and Molybdena-Alumina Catalysts	170

Y. S. KHODAKOV, P. A. MAKAROV, G. DELZER, AND KH. M. MINACHEV. Studies on Ethylene Hydrogenation and of Adsorbed C ₂ H ₄ and H ₂ on Chromia and Lanthana Catalysts.....	184
J. TSAI, P. K. AGRAWAL, J. M. FOLEY, J. R. KATZER, AND W. H. MANOGUE. SO ₂ Deactivation in NO Reduction by NH ₃ . III. Auger Studies of Deactivated Catalysts.....	192
J. TSAI, P. K. AGRAWAL, D. R. SULLIVAN, J. R. KATZER, AND W. H. MANOGUE. SO ₂ Deactivation in NO Reduction by NH ₃ . IV. Auger Studies on Deactivated Catalysts in Selective NO Reduction.....	204
ALAN BRENNER AND DENNIS A. HUCUL. The Synthesis and Nature of Heterogeneous Catalysts of Low-Valent Tungsten Supported on Alumina	216
S. GALVAGNO, J. SCHWANK, AND G. PARRAVANO. Cyclopropane Hydrogenation on Ru and Ru-Au Catalysts.....	223
P. W. WENTRCEK, J. G. McCARTY, C. M. ABLOW, AND H. WISE. Deactivation of Alumina-Supported Nickel and Ruthenium Catalysts by Sulfur Compounds ..	232
E. E. UNMUTH, L. H. SCHWARTZ, AND J. B. BUTT. Iron Alloy Fischer-Tropsch Catalysts. I. Oxidation-Reduction Studies of the Fe-Ni System.....	242
S. DE ROSSI, E. IGUCHI, M. SCHIAVELLO, AND R. J. D. TILLEY. A Study of the Selective Oxidation of Propene over a Series of Ternary Tungsten Oxides....	256
 NOTES	
A. JANKO, W. PALCZEWSKA, AND I. SZYMERSKA. The Effect of Palladium Hydride Phase Transformations on the Reconstruction and Catalytic Activity of Palladium Films	264
M. ANPO, C. YUN, Y. KUBOKAWA. Photoformation of (O ₂ ⁻) _{ads} Radicals and their Reactivity on Porous Vycor Glass.....	267
MICHAEL F. SHLESINGER AND UZI LANDMAN. Conditions for a Rate-Maximizing Temperature in Heterogeneous Catalysis	270
P. GENESTE, M. BONNET, C. FROUIN, AND D. LEVACHÉ. An Efficient and Selective Deoxygenation of Sulfoxides over CoO-MoO ₃ /Al ₂ O ₃ Hydrodesulfurization Catalyst	277
BURTRON H. DAVIS. Catalytic Conversion of Alcohols. XIV. Alkene Products from the Conversion of 3-Methyl-3-pentanol	279
H.-C. LIU, L. YUAN, AND S. W. WELLER. Specific Surface Area of Reduced Molybdena: O ₂ Chemisorption at -78°C	282
A. J. PERROTTA, R. B. BJORKLUND, J. T. HOGGINS, AND C. L. KIBBY. Alkali Phosphomolybdates for Oxidation of Methacrolein to Methacrylic Acid ..	285
KUPPUSWAMY RAJAGOPALAN AND DAN LUSS. Influence of Inerts on Kinetic Oscillations during the Isothermal Oxidation of Hydrogen on Platinum Wires	289
 LETTERS TO THE EDITORS	
B. D. FLOCKHART AND R. C. PINK. Comments on "On the Electron Donor and Electron Acceptor Properties of the γ -Alumina Surface"	291
G. M. MUHA. Radical Anions/Cations and the γ -Alumina Surface: A Reply to Flockhart and Pink	293
BOOK REVIEWS	296
ERRATUM	298

Number 2, February 1980

G. M. BLIZNAKOV AND M. P. KISKINOVA. Electron-Stimulated and Thermal Desorption Studies on Palladium. I. Oxygen	299
G. M. BLIZNAKOV AND M. P. KISKINOVA. Electron-Stimulated and Thermal Desorption Studies on Palladium. II. Carbon Monoxide	305

ISRAEL E. WACHS AND ROBERT J. MADIX. MBRS Measurements of Overlayer Effects on Surface Lifetimes and Reaction Probabilities	310
L. DAVID KRENZKE AND GEORGE W. KEULKS. The Catalytic Oxidation of Propylene. VI. Mechanistic Studies Utilizing Isotopic Tracers	316
E. A. IRVINE, C. S. JOHN, C. KEMBALL, A. J. PEARMAN, M. A. DAY, AND R. J. SAMPSON. The Isomerization of 3,3-Dimethylbut-1-ene, 3-Methylcyclopent-1-ene, and Methylenecyclopentane over γ -Alumina	326
M. J. DRINKWINE, R. DUS, AND D. LICHTMAN. Application of Electron-Stimulated Desorption Method for Studies of Coadsorption Process on a Platinum Foil Surface	336
GEOFFREY C. BOND AND GERD HIERL. Noble Metals Supported on Phillips-Type Catalysts: Preparation, Characterization, and Activity for Ethane Hydrogenolysis.....	348
W. KEIM, M. BERGER, AND J. SCHLUPP. High-Pressure Homogeneous Hydrogenation of Carbon Monoxide in Polar and Nonpolar Solvents	359
Y. IWASAWA, H. MORI, AND S. OGASAWARA. Catalytic Hydrogen Transfer Reactions between Hydroaromatics and Nitrobenzene over Polynaphthoquinone ..	366
Y. KIM, S.-K. SHI, AND J. M. WHITE. Oxygen Inhibition of CO Oxidation on Polycrystalline Rh.....	374
R. T. K. BAKER AND R. D. SHERWOOD. Catalytic Oxidation of Graphite by Iridium and Rhodium	378
D. H. OLSON, W. O. HAAG, AND R. M. LAGO. Chemical and Physical Properties of the ZSM-5 Substitutional Series	390
K. CHRISTMANN, G. ERTL, AND H. SHIMIZU. Model Studies on Bimetallic Cu/Ru Catalysts. I. Cu on Ru(0001)	397
H. SHIMIZU, K. CHRISTMANN, AND G. ERTL. Model Studies on Bimetallic Cu/Ru Catalysts. II. Adsorption of Hydrogen.....	412
D. J. PRITCHARD, D. D. MCLEAN, D. W. BACON, AND J. DOWNIE. Testing the Assumption of Surface Homogeneity in Modeling Catalytic Reactions	430
V. BOSÁČEK, V. PATZLOVÁ, Z. TVARŮŽKOVÁ, D. FREUDE, U. LOHSE, W. SCHIRMER, H. STACH, AND H. THAMM. The Properties of Strongly Dealuminated Y Zeolites	435
S. FUENTES AND F. FIGUERAS. The Influence of Particle Size on the Catalytic Properties of Alumina-Supported Rhodium Catalysts.....	443
POCHEN CHU AND FRANCIS G. DWYER. The Deammoniation Reaction of Ammonium X Zeolite	454
YUN-YANG HUANG. Ethylene Complexes in Copper(I) and Silver(I) Y Zeolites ...	461
J. R. ANDERSON, T. MOLE, AND V. CHRISTOV. Mechanism of Some Conversions over ZSM-5 Catalyst	477
I. E. MAXWELL, R. S. DOWNING AND S. A. J. VAN LANGEN. Copper-Exchanged Zeolite Catalysts for the Cyclodimerization of Butadiene. I. Catalyst Stability and Regenerability	485
I. E. MAXWELL, J. J. DE BOER, AND R. S. DOWNING. Copper-Exchanged Zeolite Catalysts for the Cyclodimerization of Butadiene. II. Catalyst Structure	493
T. T. NGUYEN, J. C. LAVALLEY, J. SAUSSEY, AND N. SHEPPARD. Infrared and Raman Spectroscopic Study of Some Aromatic Acetylenic Compounds Adsorbed on Zinc Oxide	503

NOTES

T. T. NGUYEN. Raman and Infrared Spectra of Ethynylbenzene Adsorbed on Zinc Oxide.	515
P. RATNASAMY, A. V. RAMASWAMY, AND S. SIVASANKER. Basic Molecules as Probes for the Study of Mo-Alumina Catalysts.....	519
M. HOULLA, D. H. BRODERICK, A. V. SAPRE, N. K. NAG, V. H. J. DE BEER, B. C. GATES, AND H. KWART. Hydrodesulfurization of Methyl-Substituted Dibenzothiophenes Catalyzed by Sulfided Co-Mo/ γ -Al ₂ O ₃	523
FRANCIS P. DALY. Catalytic Steam Dealkylation of Alkyl Phenols	528

M. CHANDA, K. F. O'DRISCOLL, AND G. L. REMPEL. Effect of Ligand Ratio on the Catalytic Activity of Poly(4-vinylpyridine)-Copper(II) Chelate in the Oxidation of Thiosalts by Molecular Oxygen	533
G. ERTL AND M. HUBER. Mechanism and Kinetics of Ammonia Decomposition on Iron	537
SAMORNAT VATANATHAM AND MICHAEL F. FARONA. Reactions of Diphenylacetylene with Carbon Monoxide Catalyzed by Polystyrene-Supported Molybdenum	540
J. L. GLAND, G. C. WOODARD, AND V. N. KORCHAK. Ammonia Oxidation on the Pt(111) and Pt(S)-12(111) \times (111) Surfaces	543
H. C. YAO, H. K. STEPIEN, AND H. S. GANDHI. Metal-Support Interaction in Automotive Exhaust Catalysts: Rh-Washcoat Interaction	547
R. B. CLARKSON AND S. McCLELLAN. The EPR Observation of O_2^- on Various Supported Metal Surfaces.....	551
MICHEL PRIMET, PIERRE FOUILLOUX, AND BORIS IMELIK. Chemisorptive Properties of Platinum Supported on Zeolite Y Studied by Infrared Emission Spectroscopy	553
R. THOMAS, F. P. J. M. KERKHOF, J. A. MOULIJN, J. MEDEMA, AND V. H. J. DE BEER. On the Formation of Aluminum Tungstate and Its Presence in Tungsten Oxide on γ -Alumina Catalysts	559
LETTER TO THE EDITORS	
E. R. S. WINTER. Kinetics of Oxygen Exchange	562
BOOK REVIEW	
AUTHOR INDEX FOR VOLUME 61.....	566

The Subject Index for Volume 61 will appear in the December 1980 issue as part of a cumulative index for the year 1980.